



The Secretary of Energy

Washington, DC 20585

July 29, 1994

The Honorable George Miller
Chairman
Committee on Natural Resources
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

This is in response to your letter dated March 28, 1994, regarding a proposal submitted to you on the feasibility of long-term storage and permanent disposal of nuclear materials in the Republic of the Marshall Islands. Specific responses to your questions are enclosed.

We share your concern that the proposal raises serious policy issues. In addition, it presents various technical issues requiring resolution. As indicated in my response to you of May 9, 1994, we coordinated review of this issue with other Federal agencies. An interagency working group involving the Departments of State, Defense, the Interior and Energy was formed to study the proposal and develop a unified position paper, a copy of which is also enclosed. Based on this review, and in light of current laws, the Administration does not support the proposal.

Under the Compact of Free Association, the United States may not dispose of or store radioactive materials in the Republic of the Marshall Islands in an amount or manner which would be hazardous to public health or safety. In determining what would be hazardous, the Compact provides that the United States must comply with agreed-upon international guidelines "and the laws of the United States and their implementing regulations."

In this regard, under the Nuclear Waste Policy Act of 1982, as amended (NWPA), the Department has authority to conduct site characterization activities to determine suitability for a repository at only Yucca Mountain, Nevada. Although the NWPA provides further for siting a repository and monitored retrievable storage facility through negotiations between the Nuclear Waste Negotiator and States and Indian tribes, the Energy Policy Act of 1992 removed the Republic of the Marshall Islands from the definition of "State" for

purposes of such negotiations. Of course, consistent with its sovereignty, the Republic of the Marshall Islands can decide to construct a disposal facility, subject to the terms of the Compact of Free Association and other applicable laws. However, the Nuclear Waste Fund may only be utilized for purposes of storage and disposal authorized under the NWPA, and the NWPA does not authorize construction of a disposal facility in the Republic of the Marshall Islands.

Based on the Department's evaluation and the interagency review, the U.S. Government does not support the Republic of the Marshall Islands' proposed feasibility study for establishment of a repository for high-level nuclear waste and spent fuel in the Marshall Islands. The United States Government does not have specific legal authority to participate in the proposal and does not plan to seek such authority.

We appreciate your concern with respect to this important issue, and hope that this response adequately provides the information that you have requested.

Sincerely,



Hazel R. O'Leary

Enclosures

cc: The Honorable Don Young
Ranking Minority Member

Honorable Hazel R. O'Leary
March 28, 1994
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7. Has the Department evaluated previous nuclear waste repository proposals from the Marshall Islands? If so, please provide a copy of the Department's evaluation of such proposals.
8. In general, what concerns will the United States need to consider during a review of the proposal?
9. Who are the principals involved in this proposal?
10. Finally, please describe all risks associated with the transportation and storage of nuclear wastes in the Marshall Islands.

Thank you for your assistance. I look forward to hearing from you.

Sincerely yours,


GEORGE MILLER
Chairman

February 1, 1994

**LONG-TERM STORAGE AND PERMANENT DISPOSAL OF NUCLEAR MATERIAL
A PROPOSAL FOR A FEASIBILITY STUDY IN THE MARSHALL ISLANDS**

Summary

The existence of large quantities of plutonium, highly enriched uranium (HEU), and spent fuel as well as other highly radioactive substances, without adequate provision for long-term storage and permanent disposal, confronts the international community with a serious challenge. In the wake of the end of the Cold War and the implementation of disarmament agreements have exacerbated the severity of this problem. By the separation of plutonium and HEU from dismantled nuclear weapons

it must be emphasized that the development of a site for permanent disposal will require a considerable period of time, perhaps decades, and that, in the interim, provision will have to be made for safe storage. Some materials will be stockpiled indefinitely, and others will be stored for many years, pending processing for use in civilian or military applications. A storage facility may need to accommodate a variety of purposes for many years.

Until the proper storage and disposal of fissile materials are achieved, human health and environmental protection, and international peace and security will remain at serious risk.

A solution to this nuclear challenge may lie in the Republic of the Marshall Islands ("RMI"). The Government of the RMI has indicated a willingness for one or more of the country's many remote, uninhabitable islands to be considered for long-term storage and permanent disposal of surplus nuclear materials, spent fuel, and other highly radioactive substances, subject to the outcome of feasibility studies which would credibly address economic, engineering, environmental, health, safety, and security considerations. The invitation to explore a possible solution in the Marshall Islands, a country with exceptionally close political, economic, and security ties with the United States, provides the Clinton Administration and the Congress a unique opportunity to assert a leadership role in resolving a global problem of enormous dimensions and acute severity.

The Nuclear Challenge

The military nuclear challenge facing the world today is more a matter of managing the destruction of atomic weapons than one of negotiating the reduction of their numbers. It is estimated that the dismantling of nuclear weapons pursuant to international agreements--14,000 U.S. and 27,000 Russian--will yield 100-200 tons of plutonium and approximately 1,000 tons of HEU. There will be a steady, dangerous stream of these materials for many years, as nuclear weapons will be dismantled at the rate less than 3,000 per year in the United States and Russia, combined. Storage facilities for these materials in the United States and Russia are inadequate, as each country has been compelled to concede. The United States has agreed, however, to provide financial and technical assistance to Russia for the construction of a limited storage facility for nuclear materials recovered from dismantled weapons.

There is no reason to believe that the storage conditions are any better in the other nuclear states of the FSU, Ukraine, Belarus, and Kazakhstan. This will present a problem for as long as nuclear disarmament of those nations remains in process.

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In the United States, proposals have been made to increase storage capacity for plutonium at the Pantex facility in Texas. Other sites have also been identified for that purpose. The Oak Ridge facility is considered of adequate dimension to accommodate the anticipated additional HEU, but there is a question as to whether the complex is suitable for large scale storage of plutonium. The Savannah River site offers another possibility for additional plutonium storage, however, the capacity of the facility for that purpose is very limited. Los Alamos could provide storage capacity, but also only on a limited basis. Hanford and Rocky Flats would not appear to be candidates. Military bases have been considered, but there are daunting problems involved. A 1993 report to the U.S. Congress from the Office of Technology Assessment (OTA) details the profoundly unsatisfactory storage situation, and takes note of the fact that there are no credible plans in existence for resolving the problem.

Plutonium exists in vast amounts in civilian spent fuel. According to the NAS, 130 tons of plutonium have been separated from spent fuel, of which amount, 80-90 tons are in storage. In excess of 500 metric tons of additional plutonium could be extracted from the tens of thousands of tons of spent fuel that remain in the civilian sector, worldwide. Of course, the supply of spent fuel is growing constantly. RAND estimates that 300 metric tons of plutonium will be separated from spent fuel by enrichment plants by 2003, "and a lot more in subsequent years." RAND analysts state, "We believe that these plants and materials pose a serious proliferation threat."

It is well known that adequate long-term storage facilities for spent fuel are non-existent in the United States and Russia. As in the case of plutonium, there is no permanent disposal facility for spent fuel in either country.

Although there is debate as to whether plutonium is an asset to be utilized for power production, there is no dispute that the substance cannot be entirely eliminated by "burning". A highly toxic

waste remains for storage and disposal. Moreover, processing for use in power plants results in the production of contaminated scrap, and until the plutonium is utilized and the waste and scrap are finally disposed of, a severe proliferation threat remains. For those who advocate preclusion of the use of plutonium for electrical power production (the current U.S. policy), there are various options. Vitrification, with or without mixing with highly toxic radioactive waste to discourage conversion to weapons purposes, is a partial answer. Nevertheless, storage and disposal must be secure, as the process can be reversed, although with some difficulty.

Russia, several European countries, and Japan are, at present, committed to continuing the production of plutonium for various purposes. If the United States policy of discouraging the civilian use of plutonium prevails, there will be a further, considerable exacerbation of the storage and disposal problem. If the U.S. policy fails, there will remain both a stream of new plutonium requiring continuing storage, and as noted, a flow of residual plutonium and associated highly radioactive waste from the various civilian operations.

Apart from the issue of whether plutonium should be maintained in a retrievable form for future civilian use, there is a less disputed military requirement to maintain a stockpile of the substance. It appears that, although no plutonium has been declared surplus, there is a supply that far exceeds any predictable military demand. Long-term storage and permanent disposal of the declared surplus will have to be provided.

Plutonium "pits", which are the "primary" or fission components of nuclear weapons, can be stored and disposed of intact or in pieces. There is dispute as to which approach is preferable, but security remains essential in either case, as the plutonium substance is not eliminated and can be recovered for weapons production. In addition, there are plutonium oxides, residues, and scraps, as well as contaminated metal, glass, and ceramic components, for which long-term storage and permanent disposal must be provided.

HEU from the dismantling of nuclear weapons is not considered to be surplus, and can be expected to be used in the future for both civilian and military applications. However, for civilian power plants in the United States, the material will be converted to low enriched uranium (LEU) which does not present the same proliferation risks attendant with HEU. It will be many years before the HEU is converted. Safe storage will be necessary during that period to protect the environment, as well as to limit the risk of proliferation. Following conversion, the environmental need for safe storage will remain.

Notably, the United States has agreed to purchase LEU from converted HEU in Russia. Although this is intended to eliminate 500 tons of Russian HEU, the goal will take 20 years to achieve and the plan, while laudable on non-proliferation grounds, will result in additional quantities of nuclear waste--both in Russia, where the processing will occur, and in the U.S., where the LEU will be utilized in civilian nuclear plants. (It seems that a somewhat similar program has been adopted for the HEU from the dismantling of the nuclear weapons expected to be given up by the Ukraine.) Storage and disposal issues will, thus, remain with respect to the waste from this material. It should be observed, too, that this program will leave additional, unspecified quantities of HEU remaining in Russia, where it is evident that the intention is to use the material for civilian, as well as military, purposes. How storage will be achieved for that material in the long term is an unanswered question.

The dismantling of weapons is not the only nuclear threat to the environment, human health and safety, and international security in the FSU. Russia is plagued by nuclear waste contamination from a variety of civilian and military sources. More than 100,000 Russians reside in areas where radiation levels are dangerously high, and much of Russia's arable land is seriously contaminated and thus unsuitable for farming. Cleanup is a necessity, both there, and in other countries of the

FSR. A way will have to be found to store and dispose of the resulting accumulation of radioactive material.

To this must be added the volume of surplus reactor-grade uranium in the waste stream from operations of the more than 400 commercial nuclear reactors generating electric power in 25 countries (111 reactors are located in the U.S.). Regarding the commercial nuclear industry, and without addressing the merits or risks of generating electricity in nuclear plants, the practical fact remains that adequate facilities must be devised for storage and disposal of the increasing, high volumes of its nuclear wastes. By moving effectively to solve this problem, the U.S. Government would gain not only the support of many Americans, but also the approval and participation of the international community.

In the United States, any decision regarding long-term storage facilities and a permanent repository for nuclear materials will require careful attention to the badly-impaired relations, which now block effective communication between federal agencies, (principally DOE), and state officials, public interest groups, and those local communities which would be affected. The 1993 OTA report, referenced above, takes pains to address this point. The intense public distrust of the federal government has led to efforts aimed at blocking the establishment, at Yucca Mountain, Nevada, of a permanent repository for civilian high-level nuclear waste. Those efforts, and emerging technical problems, may well defeat this multi-billion dollar project.

Relatively recent events have produced the high degree of public distrust nuclear operations. During the 1940s and 1950s, the majority of American citizens accepted their government's assurances that nuclear weapons plants and civilian power stations were safe to operate and would not damage the environment or threaten public health and safety. The near meltdown of a reactor at Three Mile Island near Harrisburg, Pennsylvania, all but destroyed that public confidence. Public trust in nuclear power was further eroded by the reactor explosion at

Chernobyl, Russia, in 1986, the shut down of a similar reactor at the Hanford Atomic Plant in Washington, in 1988, and other accidents, such as the nuclear waste tank explosion at Tomsk, Russia, in 1993.

Notably, the operation of the large Hanford Atomic Plant in the State of Washington is cited for repeated emissions, both inadvertent and deliberate, of radioactive elements from one of its several nuclear reactors, which resulted in turning the Columbia River Basin into what may be one of the most contaminated regions in the western world. Fears are now expressed that the people of farmlands, rivers, livestock, and produce of other regions of the country may also have been badly contaminated by the operations of atomic weapons development and manufacturing installation. Furthermore, it is contended that the numerous atomic bomb tests over the past half-century in the United States have caused environmental degradation and human health damage greater than previously contemplated.

Public indignation over extensive environmental damage and compromised human health has been intensified by recent DOE revelations of 204 underground nuclear tests conducted without prior public notification, weapons-grade plutonium in excess of 100 tons held in temporary storage around the country, and federal radiation experiments which deliberately exposed up to 100 people to radioactivity under circumstances where many of those affected may not have been aware of the personal risks involved.

In these circumstances, it is no surprise that many United States citizens now believe that their government has not exercised responsible stewardship of nuclear power since the inception of the Manhattan Project. Some are convinced that their basic civil rights have been violated by a government that has seriously misled them about the long-lived, pernicious effects of nuclear operations on the environment and public health and safety.

It is against this background of mounting concern over government mismanagement of nuclear power that all proposals, no matter how practical, to arrange for long-term storage and permanent disposal at any location in the United States have been met--and will continue to be met--by a firestorm of protest from state officials, public interest groups, and by those communities which would be affected. This strong resistance threatens to turn what is now intended to be interim storage into de facto long-term storage that will not assure protection of the environment and human health and safety nor properly guard against the threat of nuclear weapons proliferation.

A Possible Solution

The Republic of the Marshall Islands, located in the central Pacific Ocean, may present an opportunity to establish facilities for the long-term storage and permanent disposal of nuclear materials. The nation is comprised of two parallel chains of coral atolls, with a total land area of less than 80 square miles, spread out over an ocean area of some 750,000 square miles. These island formations, which descend 18,000 feet into the abyssal depths of the ocean, are considered geologically stable. Many of the islands are both uninhabitable and distant from any human population.

The history of the relationship between the Marshalls and the United States is a long one. After World War II, the Marshall Islands were placed under U.S. administration, as part of the United Nations Trust Territory of the Pacific Islands. Although the country gained independence as a sovereign and democratic nation in 1986, a Compact of Free Association with the United States ensured a continued, close political, economic, and security relationship. With the support of the United States, the Marshalls gained membership in the United Nations, the World Bank, the International Monetary Fund, and the International Atomic Energy Agency, among other important international organizations.

Today, the population of the country is approximately 50,000. The mainstays of the national economy are agriculture, fisheries, and tourism. Economic self-sufficiency is a national goal. However, assistance from the United States remains a major factor in the financial life of the Marshall Islands. The U.S. Government maintains a multi-billion dollar national security-related presence at Kwajalein. The United States and the Marshall Islands continue to grapple with the persistent effects of the large-scale U.S. atomic weapons testing program conducted in the islands during the height of the American nuclear weapons development program.

The Government of the Marshall Islands has a sound basis for its interest in having a feasibility study for the long-term storage and permanent disposal of nuclear materials on certain of the country's islands. It has been suggested that islands which have in some areas varying levels of residual radioactivity from U.S. atomic tests, as well as other, uninhabitable islands, might prove to be appropriate storage and disposal sites. The establishment of adequate containment facilities in the Marshall Islands could also provide a much sought after solution to the lingering problem of radioactive contamination in some areas of the country. The economic imperative facing the Marshall Islands justifies a careful scrutiny of the benefits, principally in the form of user fees which would accrue to the national economy from a storage and disposal project.

With respect to nuclear nonproliferation safeguards, it appears reasonable that the United States, which has a treaty responsibility for the defense of the Marshall Islands, would also ensure the security of any storage and disposal facilities. In addition, it is presumed that international agreed measures for accounting, monitoring, and inspection would be applied.

It must be emphasized that it is contemplated, at this time, that the project in the Marshall Islands would be for storage and disposal only. Any processing (e.g., "glassification") of nuclear substances would take place in the United States or other nuclear nations, prior to shipment to the Marshall Islands. Any consideration of processing in the Marshalls would require a careful study.

of an array of critical issues. This is an important point, as it may be desirable or necessary to collocate processing, analysis, and fabrication operations with storage facilities, for certain nuclear components and materials.

In sum, the RMI might be in a position to make a major contribution to the U.S. and other nuclear waste-producing countries, as well as to the international community at large, by providing long-term storage facility and a permanent repository for nuclear substances, with stringent safeguards to protect the environment, human health and safety, and to promote the goal of nuclear non-proliferation. In so doing, the RMI would gain revenues that would help its people achieve economic self-sufficiency. These are revenues that the Government of the Marshall Islands might possibly share with neighboring Pacific Island states.

The proposal to establish facilities for the storage and disposal of nuclear substances in the Marshall Islands could well lend itself initially to a joint United States-Marshall Islands initiative. Clearly, an expansion of the project to include other nations, Russia in particular, would be of major importance.

In examining this possible solution to the nuclear waste challenge, an essential first step would be the undertaking of a preliminary feasibility study to address the broad outlines of economic, engineering, environmental, health, safety, and security considerations. This analysis would provide the basis for a definitive decision to go ahead with a detailed feasibility study of a single atoll identified as the optimal prospective site for storage and disposal of nuclear materials.

As a rough estimate, construction of a subsurface facility, set into basaltic rock, for the disposal of a volume of plutonium reasonably estimated to become surplus, would cost about \$1.5 billion. This estimate takes into consideration the monitoring and materials-handling equipment required for state-of-the-art disposal. A much larger facility would be required to dispose of the vastly

greater quantities of nuclear waste from civilian nuclear reactors. Of course, economies of scale would be important to any calculation of the cost of the construction of the larger facility.

A long-term storage facility of modest capacity would require perhaps an additional several hundred million dollars. As one would expect, the scope of the mission of that facility would be a major factor in its eventual construction cost.

It would seem that the overall project could be economically competitive with facilities currently used to hold nuclear materials, and thus, could be financed by the private sector on the basis of expected revenues from users. Both technology and engineering expertise could be readily secured for such a project. The availability of private financing and technology and engineering expertise should not be blurred by present preoccupation with existing, costly and faulty storage facilities, nor by doubtfully credible proposals for their improvement and replacement in the United States and other nuclear nations.

It is reasonable to expect that a decision to proceed with a feasibility study would involve a degree of controversy. It should be recognized, nevertheless, that there is a compelling countervailing interest in exploring this plausible possibility of establishing facilities in the Marshall Islands that would greatly reduce the risks of nuclear proliferation, environmental contamination, and radiation-induced illnesses.

Selected References:

"Management and Disposition of Excess Weapons Plutonium", Committee on International Security and Arms Control, National Academy of Sciences, National Academy Press, Washington, D.C., 1994

"Limiting the Spread of Weapon-Usable Fissile Materials", Brian G. Chow, Kenneth A. Solomon
National Defense Research Institute, RAND, Santa Monica, California, 1993

"Dismantling the Bomb and Managing Nuclear Materials", Office of Technology Assessment
U.S. Congress, OTA-O-572, U.S. Government Printing Office, Washington, D.C., 1993

"Nuclear Health and Safety, Examples of Post World War II Radiation Releases at U.S. Nuclear
Sites", U.S. General Accounting Office. GAO/RCED-94-51FS, Washington, D.C., 1993.

Question 1: Please identify the roles the Clinton Administration and the U.S. Congress have in establishing such a facility in the Marshall Islands. What approvals are required by law?

While the Nuclear Waste Policy Act of 1982, as amended (NWPA) limited site characterization activities to Yucca Mountain, Nevada, it did allow the Marshall Islands, among others, to be considered as a site for a potential repository or monitored retrievable storage facility under a negotiated volunteer siting process. However, the Energy Policy Act of 1992 removed the Republic of the Marshall Islands from this negotiated siting process. Under the Compact of Free Association, any storage or disposal of radioactive materials by the United States in the Marshall Islands must be in accordance with the laws of the United States and implementing regulations, as well as international guidelines accepted by the United States. Further, the United States must apply the National Environmental Policy Act of 1969 (NEPA) to its activities under the Compact and related agreements as if the Marshall Islands were the United States. The United States must also comply in the conduct of any activity requiring preparation of an environmental impact statement under NEPA with standards substantively similar to those required by various United States environmental laws. Finally, there is no specific authority for the United States to participate in the proposal. Legislative action would thus be required before the United States could participate.

The attached State Department memorandum of July 21, 1994, has identified treaties such as the Basel Convention which prohibits the export of hazardous wastes from OECD to non-OECD countries, and the "Matsunaga" Amendment which bans the disposal of United States nuclear wastes in the Pacific Basin without prior Congressional approval.

A more detailed discussion of the applicable regulations is included in the response to Question 5 in this report.

Question 2: With respect to nuclear waste from the United States, please describe the geographic source of the material, the nature of the waste itself, and the systems required for its safe transportation.

The geographic sources and the physical characteristics of nuclear waste in the United States are derived from the EIA Service Report, Spent Nuclear Fuel Discharges from U.S. Reactors 1992 (May 1994).

Geographic source of the nuclear waste and spent fuel for storage and disposal:

Commercial Spent Fuel	107 Reactor Sites in 34 States
DOE Reactor Irradiated Nuclear Material	8 Sites in 6 States
Commercial High-Level Waste	1 Site in 1 State
DOE Defense High-Level Waste	3 Sites in 3 States

Nature of the waste and spent fuel:

Commercial Spent Fuel is removed from light water power reactors and contains low enriched uranium, fission products, plutonium, and other transuranium elements. Since the United States does not reprocess commercial reactor spent fuel, the wastes remain in the fuel rods for subsequent storage and disposal.

DOE Reactor Irradiated Nuclear Material comes from a variety of sources including commercial spent fuel obtained for research purposes, and nuclear energy research, weapons production, naval and spent fuel from foreign reactors. It can contain low or highly enriched uranium, fission products, plutonium and transuranics.

High-Level Wastes are generated from the reprocessing of commercial, weapons production, and naval reactor spent fuels. Commercial reprocessing of reactor fuel has been limited and no longer takes place. The Department of Energy has ceased the reprocessing of irradiated fuel and no longer is producing additional supplies of plutonium and highly enriched uranium. These wastes contain many of the same fission products as commercial reactor spent fuel but very little uranium and plutonium.

Fissile Material Disposition

The RMI preliminary proposal discusses the possibility of storing excess fissile materials from dismantled nuclear weapons, assuming these materials are rendered proliferation resistant either from irradiation as fuel mixed with uranium in a light-water reactor or mixed in a dilute form with glass and high-level radioactive wastes. The principle behind these options was developed by the National Academy of Sciences in its report on plutonium disposition and is known as the "spent fuel" standard. The National Academy also found that technology needed to achieve the "spent fuel" standard for plutonium is 10 to 15 years away. The Department in coordination with the White House and other agencies is engaged in a process to address the disposition of excess plutonium from weapons. Disposition options have not been selected by the Department and will be the subject of a Programmatic Environmental Impact Statement.

Systems required for safe transportation:

Currently, truck and rail shipping casks are available to transport spent nuclear fuel (SNF) from U.S. commercial reactor sites to a storage or disposal facility. These casks are certified by the Nuclear Regulatory Commission (NRC) for their intended use. Transportation of SNF to the Marshall Islands for storage or disposal would require licensing of transportation casks for sea or air shipping.

Shipping casks and the ocean-going vessels specifically built to transport the shipping casks currently exist. Shipping casks are massive, durable containers weighing from

25 tons for truck and up to 125 tons for rail transport. These containers are used to transport spent fuel and high-level waste, and since the contents are highly radioactive the casks are heavily shielded for safe handling. All U.S. shipping casks must be designed to meet the requirements of 10 CFR Part 71 "Packaging and Transportation of Radioactive Material." Cask manufacturers must submit a safety analysis report on their cask design to the Nuclear Regulatory Commission for approval. Upon approval the NRC will issue a Certificate of Compliance for the cask, for the specific use proposed in the safety analysis report.

To demonstrate compliance, tests specified in 10 CFR Part 71 for normal conditions and hypothetical accident conditions of transport must be conducted by subjecting a sample cask or scale model to tests or analyses acceptable to the NRC. Of specific interest to sea shipments is the hypothetical accident condition test in which the cask is immersed in water at a depth of at least 15m (50ft) for not less than eight hours. However, to assure the safety of a shipment the NRC may require additional accident tests. In the case of sea shipments, the NRC could adopt the deep water immersion test the International Atomic Energy Agency (IAEA) recommends in its advisory regulations. The IAEA advisory regulations require demonstration, by actual immersion, pressure test or calculation, that a cask can maintain its structural integrity at a water depth of 200 m (667ft). The IAEA chose the 200 m depth because it corresponds to the approximate depth of the continental shelf.

Ships bearing high-level nuclear wastes are required to minimize the risk of a marine accident through extensive duplication of equipment including rudders, engines propellers, and electrical supply systems. If an accident to the ship does occur the damage is minimized by strengthened hulls and additional watertight compartments and bulkheads to give a high degree of reserve buoyancy.

Other safety features include extensive fire fighting equipment, machinery duplication, cargo monitoring aids, cooling systems in the holds and satellite equipment for tracking navigation, communication and ship location.

The ships automatically report their position, heading and speed on a regular basis - using a satellite monitoring system to a control center. Automatic reports ensure that the track of the ship is constantly monitored.

In the event of a ship sinking, a location and telemetry system which can operate to a depth of 8,000 m (26,667 ft) allows the emergency response team to locate the ship accurately and obtain information to assist salvage operations. The telemetry equipment can be used to determine whether the ship has remained intact and in what attitude it is lying, together with additional information for the salvage team on the condition of the ship and its cargo.

Question 3: Please evaluate and describe the manner in which waste would be handled and transported, including identification of methods of transport, and need for roads, ports, and other related facilities.

Method of handling and transport:

- Shipping spent fuel and high-level waste to the Marshall Islands would entail transport by rail or truck, in transportation casks suitable for shipment in ocean-going vessels, from the reactors to port facilities on the East and West Coasts of the United States.

Need for roads, ports and other related facilities:

- The need to upgrade system infrastructure, such as road and rail systems, to support transport of waste from the reactors to a port facility would probably need to be studied.
- The West Coast ports of Seattle, San Francisco, Los Angeles, and San Diego (including naval bases or shipyards) or any port with crane lift capacities in excess of 125 tons can handle the loading of rail and truck casks. Special consideration should be given to the fact that ports capable of transferring these casks onto ships are in regions of high-population density.
- The only related facilities that would be required are those that may be required to comply with the provisions of 10 CFR Part 73 "Physical Protection of Plants and Materials" at the port facility. 10 CFR Part 73 provides for armed escorts at the port.

Question 4: The Marshall Islands proposal suggests that wastes from other nations, including Russia, may be secured for this site. Please identify all issues related to the co-mingling or co-storage of nuclear wastes.

- Technical reasons aside, the Department would not support a policy that allows co-mingling of international high-level wastes due to political and economic considerations. Any repository program must address three fundamental issues: transportation, storage, and disposal. Further, liability questions would have to be carefully considered. In the case of a Marshall Islands repository, transportation becomes an especially important consideration. In addition to technical questions, a major issue would be political, both domestic, and international. Accordingly, any proposal would require that the Department of State be closely consulted. Also, the Department would want its waste segregated from that of other nations for ease of accountability.
- A repository for multinational HLW, in addition to being subjected to detailed technical review, would require a multinational legal framework outlining safeguards, geologic characteristics, transportation specifications, liability issues, cost sharing, and contract specifications.

Section 122 of the NWPAA provides for a period of retrievability, to be determined by the Secretary, of any spent nuclear fuel placed in a repository for purposes of public safety or economic value recovery. This requirement does not address a repository outside of the control of the United States Government. A proposal such as use of the Republic of the Marshall Islands would require a change in current policy and amendment to the NWPAA to allow retrieval of United States spent fuel from such an international repository. These concerns for the retrievability of co-mingled United States nuclear waste from an international repository at a remote location would also be relevant for other participants in the proposed repository. Further, co-mingling raises significant Non-Proliferation Treaty (NPT) and Nuclear Safeguards questions.

The proposal claims that the prospective repository would foster "participation of the international community" establishing, in essence, a world repository. HLW disposal programs are underway or envisioned in a number of European and Asian countries. These nations, for technological, social, and legal reasons, are unlikely to abandon their existing programs.

Question 5: Please list all U.S. and International laws, including treaties or similar agreements, to which such a proposal would be bound.

General Statutes and International Treaties:

"Compact of Free Association Act of 1985", 48 USC § 1681 (PL 99-239 as amended). The Compact provides that the United States may not dispose of or store radioactive materials in the Marshall Islands except in an amount or manner which would not be hazardous to public health or safety. In determining what is hazardous, the United States must not only comply with United States laws and regulations, but also with international guidelines which it accepts. These would include the Code of Practice on the International Transboundary Movement of Radioactive Waste, noted below.

International perspective:

Transporting radioactive wastes across national boundaries has been a subject of some international attention. The International Atomic Energy Agency (IAEA) has recommended standards and guidelines for transportation of radioactive materials. These are:

- Regulations for the Safe Transport of Radioactive Material, Safety Series No. 6, 1988
- Code of Practice on the International Transboundary Movement of Radioactive Waste (INFCIRC/386)-1990

Over the years, the IAEA developed extensive guidance for management of radioactive waste. Currently the Agency is developing a comprehensive set of

coordinated guidance under its Radioactive Waste Standards Program (RADWASS). Directly applicable documents will include the following (note: these are works in progress, and others will be applicable when developed by RADWASS):

- RADWASS Safety Fundamentals document The Principles of Radioactive Waste Management
- RADWASS Safety Standard documents Establishing a National Radioactive Waste Management System

A repository in the Marshall Islands for Spent Nuclear Fuel or High-Level Waste would presumably be subject to IAEA safeguards. Transfer of U.S.-origin spent nuclear fuel or high-level radioactive waste would be subject to IAEA safeguards.

- General safeguards information is in IAEA documents. For example: The Agency's Safeguards System (1965, as provisionally extended in 1966 and 1968), INFCIRC/66/Rev.2); The Structure and Content of Agreement Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons, INFCIRC/153 (corrected); as well as discussion in a series of IAEA safeguards information (IAEA/ SG/INF) documents.

Other applicable IAEA documents include:

- Concepts and Examples of Safety Analysis for Radioactive Waste Repositories in Continental, Geological Formations, Safety Series No. 58 (1983)

Other site specific, transport regulations for transiting major shipping canals could apply.

All issues of international law including treaties or similar agreements should be directed to the Department of State.

United States regulations for transportation and handling could apply as set out in:

The Code of Federal Regulations (Energy, Environment, and Transportation), including:

- Title 10 (Energy) Parts 20 (Standards for Protection against Radiation); 50 (Domestic Licensing of Production and Utilization Facilities); 60 (Disposal of High-Level Radioactive Wastes in Geologic Repositories); 71 (Packaging And Transportation Of Radioactive Material); 72 (Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste); 73 (Physical Protection Of Plants And Materials); 75 (Safeguards on Nuclear Material - Implementation of U.S./IAEA Agreement); 960 (General Guidelines for the Recommendation of Sites for Nuclear Waste Repositories); and 961 (Standard Contract for Disposal of Spent Nuclear Fuel and/or High-

Level Radioactive Waste);

- Title 49 (Transportation) Parts 171 (Hazardous Materials Regulations, General Information, Regulations, and Definitions); 172 (Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements); 173 (Shippers - General Requirements for Shipments and Packagings); 174 (Carriage By Rail); and 177 (Carriage By Public Highway).
- Title 40 (Protection of Environment) Part 191 (Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes);

Question 6: Has the Marshall Islands government presented this proposal to the Administration, and if so, what is the Administration's position with respect to this proposal?

The current proposal was presented to Dr. Tara O'Toole, the Department's Assistant Secretary for Environment, Safety and Health, by representatives of the Republic of the Marshall Islands on February 23, 1994.

- Following an interagency review involving the Departments of State, Defense, Interior and Energy, the Clinton Administration does not support the proposal for an international high-level radioactive waste repository in the Republic of the Marshall Islands. The United States has no specific legal authority to participate in the proposal, and the potentially significant environmental and safety risks, liability issues, and technical, economic and political concerns associated with the proposal are of such a magnitude that the Administration does not plan to seek such legislation.

Question 7: Has the Department evaluated previous nuclear waste repository proposals from the Marshall Islands? If so, please provide a copy of the Department's evaluation of such proposals.

In December 1987, President Kabua of the Republic of the Marshall Islands offered to enter into consultation with the United States to evaluate the utility of conducting a feasibility study on the storage and disposal of high-level nuclear wastes on uninhabitable islands in the Marshalls. At the time, the 1987 amendments to the NWPA had just been passed in which Yucca Mountain was named as the sole site for characterization by the Department for suitability as a repository. However, the Act also allowed for independent siting attempts through the Office of the Nuclear Waste Negotiator. The Republic of the Marshall Islands was included in the definition of States eligible to participate in the volunteer siting process. The Marshall Islands proposal was supported by, among others, Rep. Barbara Vucanovich of Nevada. (See Attachment 1).

The Republic of the Marshall Islands entered into free association with the United States on October 21, 1986. The status of free association recognizes that the Republic of the Marshall Islands is now a sovereign, self-governing state. Thus the Energy Policy Act of 1992 deleted mention of the Marshall Islands in the list of States and Indian Tribes which may participate in federal negotiated siting in accordance with the Nuclear Waste Policy Act.

Question 8: In general, what concerns will the United States need to consider during a review of this proposal?

The Republic of the Marshall Islands, formerly part of the Trust Territory of the Pacific Islands, entered into free association with the United States on October 21, 1986. The status of free association recognizes that the Republic of the Marshall Islands is now a sovereign, self-governing state; by the terms of the compact of free association, the United States is responsible for defense, and for extending agreed-upon amounts of economic and service assistance. The United States has an agreement with the Republic of the Marshall Islands for use of a missile range at Kwajalein Atoll for 30 years. Another subsidiary agreement provides for the settlement of all claims arising out of the nuclear testing programs conducted by the United States at Bikini and Enewetak Atolls from 1946 to 1958. These historical agreements notwithstanding, given the fact that the Marshall Islands constitute a fully independent Republic, and given the framework of laws and regulations governing the United States radioactive waste management program, any repository in the Marshall Islands could not be considered part of the NWP program, but instead must be considered to be an "international repository." International regulations governing such an enterprise are almost nonexistent (there are IAEA guidelines for the international transport of nuclear materials); however, unilateral or even bilateral attempts at siting a repository for U.S. nuclear wastes outside United States borders would very likely attract controversy.

The nuclear testing policies of previous Administrations (predecessors of the Department of Defense and the Department of Energy) have, from both environmental and social perspectives, impacted the Republic of the Marshall Islands. Further, since production of spent nuclear fuel and defense high-level radioactive wastes occurs in the coterminous United States, any proposal for a repository in the Republic of the Marshall Islands would be scrutinized for the equity of such an action. Executive Order 12898 on Environmental Justice (signed February 11, 1994) calls for the identification of adverse impacts of Federal actions on minority or low-income populations before decisions implementing these actions are made.

Disposal of waste in an island repository is one of a number of methods for managing high-level radioactive waste studied by the Federal Government. Disadvantages associated with island disposal concept include the risks associated with ocean transport under adverse weather conditions and the fact that geologic foundations of many islands are composed of permeable rock types of volcanic origin. The intrusion of sea water into an island repository through these permeable geologic structures could increase the chances that high-level radioactive waste would come into contact with the biosphere.

Many islands experience frequent and intense seismic and volcanic activities. Such activities could discharge waste into either lava flows or into the atmosphere.

The humid Marshall Islands climate has a pronounced monsoonal season, with correspondingly high precipitation values. The highly fractured (and transmissive) volcanic rocks typical of the Republic of the Marshall Islands would provide fast-pathways for infiltrating waters, potentially inundating any subsurface repository.

The proposal suggests study of the feasibility of using the Marshall Islands as a site for either temporary storage or long-term disposal of high-level radioactive waste and other nuclear materials. The considerations outlined above relate principally to the option of a repository site in the Republic of the Marshall Islands. As to the possibility of using an island site for only a temporary storage site, with a repository in the United States, logistics involved in such a scenario would render the proposition prohibitively expensive.

Question 9: Who are the principals involved in this proposal?

Since 1987, President Amata Kabua of the Marshall Islands has proposed storing United States nuclear wastes in either the Bikini or Enewetak lagoons. Both of these were taken over by the United States for early nuclear weapons tests after the residents were removed. Representative Barbara Vucanovich has also urged the Administration to open negotiations with the Marshall Islanders. Jonathan Weisgall is an attorney who has represented the Bikinians since 1975 and has been quoted in the press as a proponent of these proposals. Ambassador Wilfred Kendall of the Republic of the Marshall Islands has been named by President Kabua to head a Commission charged with studying the proposal.

Question 10: Finally, please describe all risks associated with the transportation and storage of nuclear wastes in the Marshall Islands.

The risks generally associated with the transport and storage of high-level radioactive waste and spent fuel in the U.S. also apply to the specific case of the Marshall Islands. These general risks are described below:

Transportation of SNF or other radioactive material has an excellent safety record for shipments within the U.S. and for those limited shipments that have occurred over the seas by or for foreign countries. However, for a country, such as the Republic of the Marshall Islands, embarking for the first time on such an endeavor, the question of safe shipments would require careful scrutiny.

Generally, there are two categories of risks associated with transportation. First, the routine exposure of radiation from normal operations to both workers and the general public. The NRC regulations limit exposure to 10 millirem per hour at any point 2 meters from the cask. Second, there are risks to the workers, the general public, and the environment in the rare event of an accident. Spent nuclear fuel casks are

designed to provide radiological safety under specific hypothetical accident conditions which include impact, fire, puncture, and deep immersion. Radiological safety criteria address containment, shielding, and subcriticality. It should be noted that for sea transport of spent nuclear fuel, risks to the general public are insignificant due to the lack of population receptors over the ocean. Risks to the public, workers, and the environment are controlled by international treaties in international waters, and are strictly controlled by numerous Federal, state, and local regulations within the United States.

There are site-specific risks associated with the shipment of large quantities of SNF to the RMI, whether for storage or for permanent disposal. These include the logistics of making ocean-going barge shipments over a period of 40 years or more. The large numbers of voyages would increase the risks of loss at sea due to collision, weather-related incidents, or the deliberate diversion of SNF.

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CHAIRMAN
COMMITTEE ON NATURAL RESOURCES

REMARKS:

SUBJ: APPOINTMENT SCHEDULING
QUESTIONS & ANSWERS
SUBMITS PROPOSAL FOR LONG-TERM
STORAGE AND PERMANENT DISPOSAL
OF NUCLEAR MATERIALS

FOR USE BY ACTION OFFICE ONLY

ACTION REFERRED TO	DATE	RETURN TO
1		
2		
3		

ACTION TO: PD

TYPE ACTION: Prepare final reply

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